

ORGANOLEPTIC PROPERTIES AND SHELF LIFE OF PRESERVED MACKEREL BY DIFFERENT ANTIMICROBIAL COATING

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ABSTRACT

Spoilage of food products is due to chemical, enzymatic or microbial activities One-fourth of the world's food supply and 30% of landed fish are lost through microbial activity alone. With the ever growing world population and the need to store and transport the food from one place to another where it is needed, food preservation becomes necessary in order to increase its shelf life and maintain its organoleptic properties like taste, flavour, texture, appearance. An antimicrobial coating contains an antimicrobial agent that inhibits the ability of microorganisms to grow. The most frequent antimicrobials incorporated in Mackerel packaging films are lemon peel oil, olive oil, mustard oil. The aim of the present review is to summarize current information about the role of antimicrobial coating for enhancing the organoleptic properties and increasing the shelf life of Mackerel.

KEYWORDS: Mackerel, Antimicrobial Coating, Organoleptic Properties & Shelf Life

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INTRODUCTION

Mackerel (*Rastrelliger kanagurta*) is a species of Mackerel in the scombroid family (family Scombridae) of order Perciformes. It is commonly found in the Indian and West Pacific oceans, and their surrounding seas. Mackerel as food: is an important food fish that is consumed worldwide. As an oily fish, it is a rich source of omega-3 fatty acids.

ANTIMICROBIAL COATING

The term antimicrobial coating encompasses any kind of coating used to control microbial growth in a Mackerel. These include packaging materials and edible films and coatings that contain antimicrobial agents and also techniques that modify the atmosphere within the package. Edible Coatings (EC) added with natural antimicrobials is a promising preservation technology for raw and processed fish because they provide good barrier against spoilage and pathogenic microorganisms.

Different oil used for antimicrobial coating: **LEMON OIL** Lemon oil is an essential oil extracted from lemon peels. It is cultivated mainly for its alkaloids, which are having anticancer activities and the antibacterial potential in crude extracts of different parts (viz., leaves, stem, root and flower) of Lemon against clinically significant bacterial strains has been reported (Kawaii et al., 2000). Citrus flavonoids have a large spectrum of biological activity including antibacterial, antifungal, antidiabetic, anticancer and antiviral activities (Burt, 2004;

Ortuno et al., 2006). **OLIVE OIL** can be used to preserve vegetables, meats, fish, cheese and herbs. Olive oil is a natural preservative that prevents spoilage by isolating the food from air, providing a seal that can delay oxidation, deterioration and moulding. Olive oil in addition to other uses is an excellent preservative for storing and preserving fresh products. **MUSTARD OIL** and their constituents are known to possess antibacterial, antifungal, antiparasitic and insecticidal properties. It is supposed that foodstuffs with high protein and fat content can protect bacteria from the antibacterial effect of mustard oil and other natural antimicrobials. Mustard oils are aromatic, concentrated, hydrophobic liquids containing more than 50 different components. It has been suggested that mustard oil containing phenolic compounds possess the strongest antimicrobial activities.

Organoleptic Properties or Sensory Evaluation: Is a scientific discipline that analyses and measures human responses to the composition of mackerel, e.g. appearance, touch, odour, texture, temperature and taste. In schools it provides an ideal opportunity for students to evaluate and give feedback on their dishes, test products and experimental designs.

Sensory Evaluation can be used to

- compare similarities/differences in a range of dishes/products;
- evaluate a range of existing dishes/food products;
- analyse food samples for improvements;
- gauge responses to a dish/product, e.g. acceptable v unacceptable;
- explore specific characteristics of an ingredient or dish/food product;

Shelf life of Preserved Mackerel: Response surface methodology was used for the assessment of shelf life of Mackerel. Shelf life of the product refers to the length of time from when it is brought to home to the time when it is no longer safe or good enough to the quality of consumer. Shelf life also refers as that how long fresh Mackerel remain safe and tasty to eat (Shelf life advice.com). Freshness and safety of Mackerel depends on handling of the mackerel. Handling is done by different preservation method of mackerel shelf life: is the time frame over which a food product can be relied upon to retain its quality characteristics. Shelf life encompasses several facts of food quality including safety nutritional value, and sensory properties. Shelf life affects food quality, which in turn influence the consumer's buying decisions involve different step of preservation.

METHODOLOGY

Processing and Packaging of Mackerel by Antimicrobial Coating

Material Used in Processing of Mackerel: Fresh Mackerel of good variety, mustard oil, olive oil, chilli powder, salt, turmeric powder, Lemon peel oil.

Processing of Mackerel: For preserving the Mackerel, 30 Mackerels were selected from the market, which was further divided in to two for processing. 15 were coated with mustard oil (250 ml) and remaining 15 were coated with mixture of olive oil (250ml) and lemon oil (10ml). Take mustard oil and solution of lemon peel oil + olive oil in separate bowl. Add turmeric powder, salt, chilli powder in both bowl and mix it properly. Dip 15 mackerel in mustard oil solution and dip 15 Mackerel in lemon peel oil + olive oil solution.

Material Used in Packaging of Mackerel: polythene, aluminium foil, glass jar.

Packaging of Mackerel: firstly pack 8 mackerel which was dipped in mustard oil solution in a pair in transparent polythene then covered with aluminium wrapper and sealed it with the help of sealing machine. Same procedure was followed for the 8 mackerel which was dipped in lemon peel oil and olive oil solution. Remaining 14 fish further divided in to 7-7 which was dipped separately in both solutions packed in to glass jar.

Organoleptic Properties Evaluation of the Mackerel

Preservation of Mackerel by different method mentioned the code upon the sample. Organoleptic properties were evaluated by the panellist. Then score cards were filled by panellists. The best preservation method of mackerel was evaluated by the given score of panellists. Calculate the given score.

Shelf Life of Preserved Mackerel by different Antimicrobial Coating

Wash the mackerel with tap water. Dry the washed mackerel and dipped into different solutions of oils. Pack the mackerel in polythene and jar. Store the packed mackerel in a deep freezer. Observe the shelf life at time to time by using different parameter.

RESULTS AND DISCUSSIONS

Sensory evaluation of packed and processed Mackerel by expert panel of members on hedonic scale and marking was done on the four parameters-

- Body and Texture
- Colour and Appearance
- Flavour and Taste
- Overall Acceptability

Treatments

Table 1: Distribution of Sample

Treatments	Sample Preparations
T1	Mackerel preserved in glass jar by mustard oil
T2	Mackerel preserved in polythene by mustard oil
T3	Mackerel preserved in glass jar by olive + lemon oil
T4	Mackerel preserved in polythene by olive + lemon oil

Parameter 1- Body and Texture

Table 2: Individual Markings for Body and Texture

	T1	T2	T3	T4
Member 1	8	8	8	8
Member 2	8	8	8	7
Member 3	8	8	7	9
Member 4	7	7	8	8
Member 5	8	7	7	8
Total	39	38	38	40

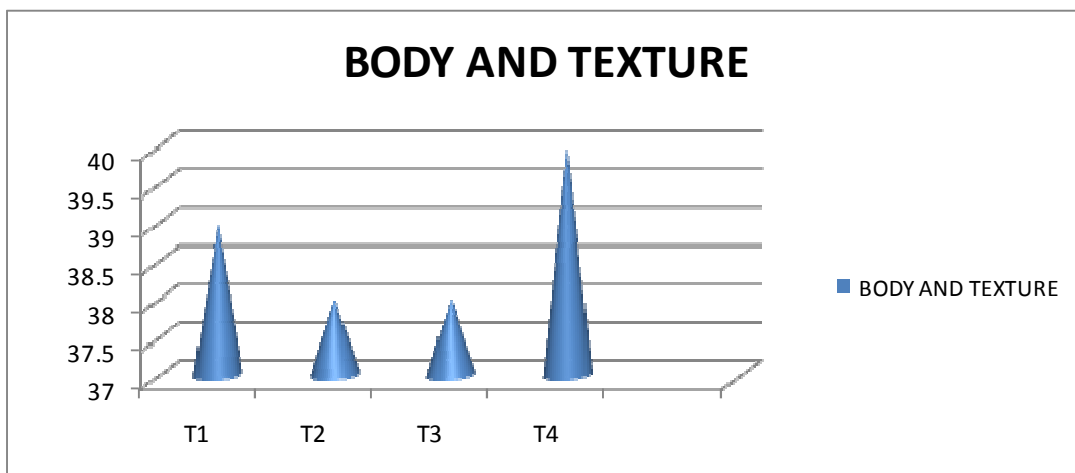


Figure 1: Graphical Representation- Body and Texture

From the above graph it shows that the sample most accepted sample was T4 by sensory panellist members and its gets highest scoring for body and texture. Then after sample T1 and sample T2 and T3 respectively.

Parameter 2: Colour and Appearance

Table 3: Individual Markings for Colour and Appearance

	T1	T2	T3	T4
Member 1	8	9	8	8
Member 2	8	8	8	8
Member 3	8	8	9	9
Member 4	8	8	9	8
Member 5	9	7	8	8
Total	41	40	42	41

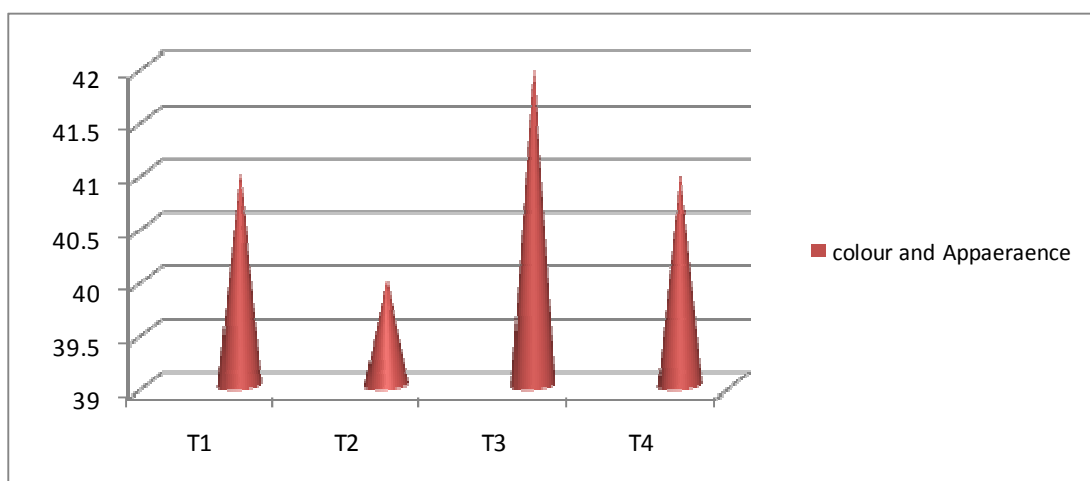


Figure 2: Graphical Presentation of Colour and Appearance

From the above graph it shows that the sample T3 is most accepted among the sensory panellist members and it gets highest scoring for colour and appearance. Then after sample T1& T4and sample T2 respectively. Sample T3 have higher score for colour and appearance, sample T2 have least score of for colour and appearance.

Parameter 3: Flavour and Taste

Table 4: Individual Markings for Flavour and Taste

	T1	T2	T3	T4
Member 1	8	8	8	8
Member 2	8	9	8	9
Member 3	8	8	9	9
Member 4	8	8	9	9
Member5	8	8	8	8
Total	40	41	42	43

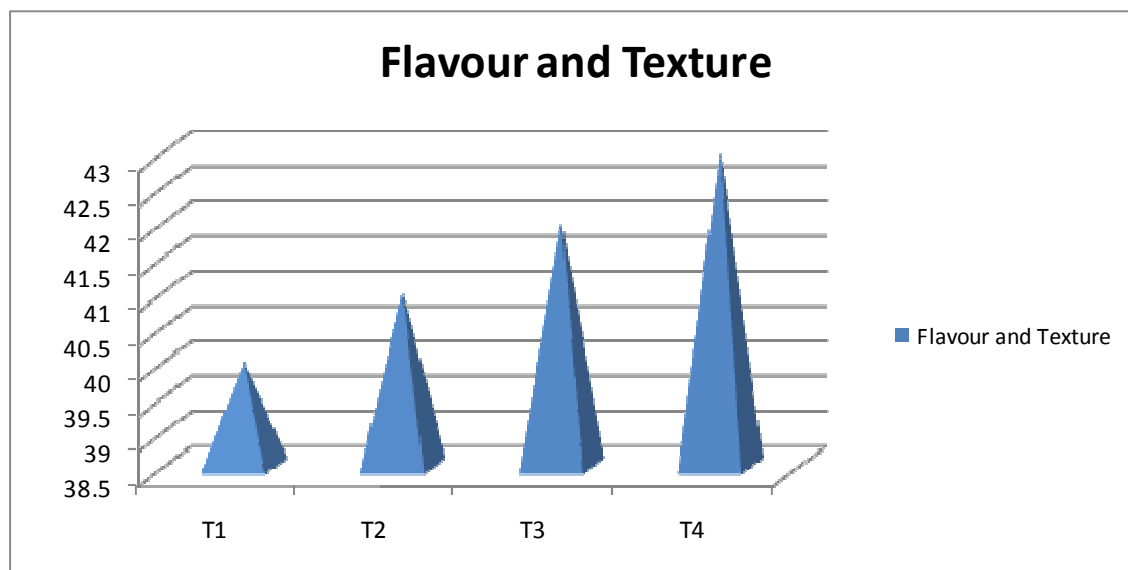


Figure 3: Graphical Presentation of Flavour and Texture

From the above graph it shows that the sample most accepted sample was T4 by sensory panellist members and it gets highest scoring for Flavour and taste. Then after sample T3 and sample T2 respectively. Sample T4 have higher score for flavour and taste, sample T1 have lower score for flavour and taste.

Parameter 4: Overall Acceptability

Table5: Individual Markings for Overall Acceptability

	T1	T2	T3	T4
Member 1	8	8	9	9
Member 2	9	8	8	8
Member 3	9	8	9	8
Member 4	8	8	8	8
Member 5	8	8	9	9
Total	42	40	43	42

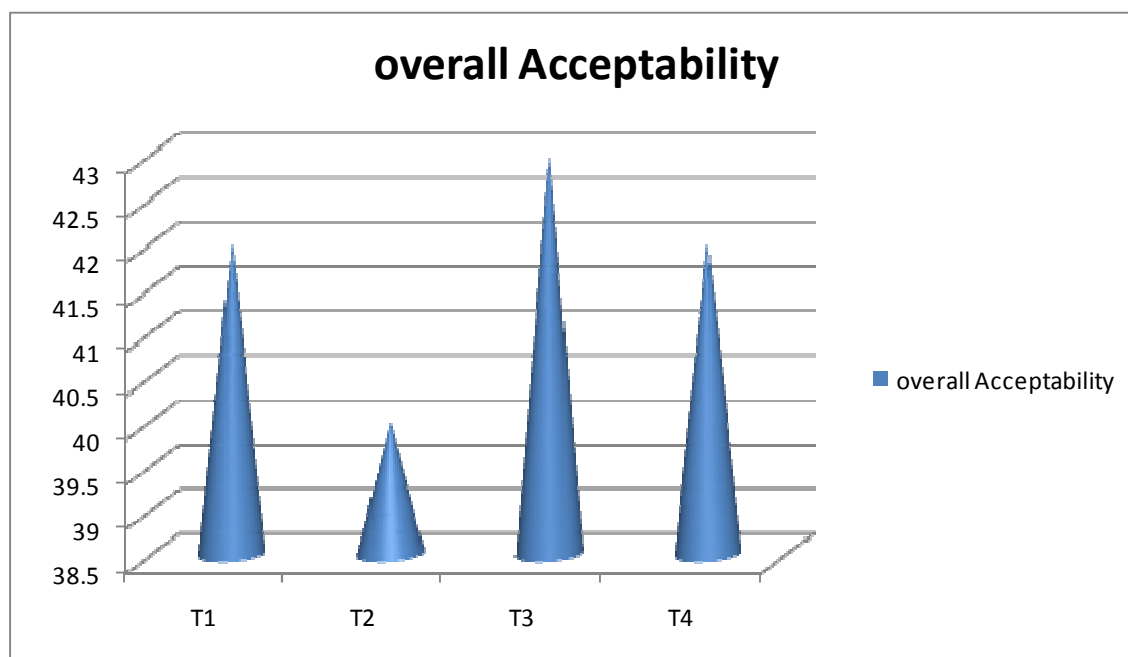


Figure 4: Graphical Presentation of Overall Acceptability

From the above graph it shows that the sample most accepted sample T3 by sensory panellist members and its gets highest scoring for Overall acceptability.

Then after sample T4& T1and sample respectively. Sample T3 have higher score for overall acceptability, sample T2 have lower score for overall acceptability.

Overall Calculation

Overall calculation are done to know most acceptability of the product in all terms of quality by sensory evaluation scoring given by the panellist members, in this all scoring of texture, colour, flavour and taste are calculated in the table, by this we get do statistical analysis and obtained standard deviation, average and other calculations.

Table 6: Overall Calculation

Parameters	T1	T2	T3	T4
1	39	38	38	40
2	41	40	42	41
3	40	41	42	43
4	42	40	43	42
Total	162	159	165	166
Average	40.5	39.75	41.25	41.5
Standard Deviation	1.29	1.25	2.21	1.29

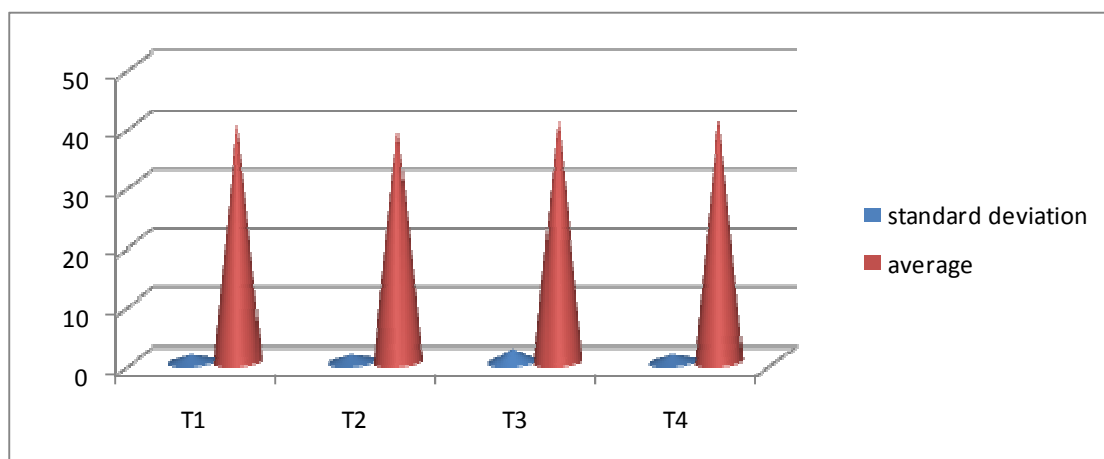


Figure 5: Graphical Presentation of Standard Deviation and Average of Different Treatments

SUMMARY AND CONCLUSIONS

Antimicrobial coatings by using oil are most active as natural antioxidants and antibacterial in seafood. These components can delay the chemical changes, retard the microbial growth, maintain the sensory characteristics, and extend the shelf-life of mackerel during storage. Antimicrobial coating can be utilized as safe methods for the preservation of fish and seafood during storage. For the insurance fish quality, organoleptical indicator is good to determine the quality and freshness of fish and to detect the fish spoilage. The organoleptic evaluation of the preserved mackerel was done by using nine point hedonic scales by panel of 5 members. The scoring for each of the preserved mackerel was done according to various parameter i.e. texture, flavour, taste, colour & appearance and overall acceptability.

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